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How is the DoD Logistics Transformation Going?

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PREFACE

This Draft Report (Unrestricted) documents a memo that I wrote to Michael Rich in response to the question stated in the title: How is the DoD logistics transformation going? His question was motivated by the advent of a new administration in Washington that had stated its intent to make reform of the military an early top priority.

My purpose was to formulate an answer that was informed by the logistics research conducted in RAND's three FFRDCs. As the footnotes attest, I drew primarily on published studies of the past few years, but I have also cited some unpublished research.

A number of logistics analysts provided me with useful feedback on earlier drafts. They include Laura Baldwin, Frank Camm, John Dumond, Lionel Galway, Chris Hanks, Nancy Moore, Ray Pyles, Bob Roll, and Bob Tripp.

SUMMARY

The term "DoD logistics transformation" describes activities intended to improve the ways in which the DoD manages its equipment and material, particularly from initial fielding to disposal. The transformation has three dimensions that correspond to the perception that three kinds of dramatic change are needed:

- Cost Reduction--The DoD logistics system must reduce the costs of providing support.
- Responsiveness--The DoD logistics system must improve its basic business processes to match best commercial performance levels.
- Agility--The DoD logistics system must develop new ways of accomplishing its support mission that are tailored to the requirements and constraints of the post-Cold War era.

The DoD has made progress on each of the three dimensions of the logistics transformation, but progress has been uneven. Broadly speaking, reductions in costs have outpaced improvements in responsiveness, which in turn have outpaced improvements in agility. Given the uneven progress on the three dimensions, it is appropriate to shift emphases now. DoD logistics transformation efforts in the near term should emphasize improving the system's responsiveness and agility. The focus should not be on achieving cost savings by reducing the resources available to the system.

Achieving the DoD logistics transformation requires a dramatic change in organizational culture: the DoD logistics system must become more

adaptable, innovative, and comfortable with continuous change. Fortunately, when assessed against indicators of successful organizational change, today's DoD logistics community scores well. This bodes well for the continued progress of the DoD logistics transformation.

HOW IS THE DOD LOGISTICS TRANSFORMATION GOING?

The intent of this draft report is to provide a brief answer to the question, "How is the DoD's logistics transformation going?" as well as to suggest how its progress might be furthered.¹

What is the "DoD logistics transformation"?

The term "logistics transformation" has been used since the mid-1990s to describe activities intended to improve the ways in which the DoD manages its equipment and material, particularly from initial fielding to disposal.²

The transformation of the DoD logistics system has three dimensions that correspond to widespread perceptions that three kinds of dramatic change are needed. Key terms for referring to these three dimensions are *Cost Reduction*, *Responsiveness*, and *Agility*.³

- **Cost reduction:** The DoD logistics system must reduce the costs of providing support.

¹ The most recent (FY2000) update to the DoD Strategic Logistics Plan does not use the term "logistics transformation," but the four Services as well as the Defense Logistics Agency still use the word "transformation" to describe their logistics reform initiatives.

² The term logistics is sometimes used to include acquisition activities, though acquisition reform usually merits its own attention; at other times, the term is understood to include deployment activities, though deployment includes the movement of troops as well as their equipment and supplies.

³ For a recent General Accounting Office assessment of the DoD logistics system that focuses on the first two of these dimensions, see *Major Management Challenges and Program Risks: Department of Defense*, GAO-01-244, January 2001: "To its credit, the Department has initiated a number of Department-wide reform initiatives and other actions to improve its key business processes in such areas as . . . logistics reengineering. While these initiatives have produced some positive results, much more remains to be done before the reform process is successfully completed" (p.7).

- **Responsiveness:** The DoD logistics system must step up its performance to match "best commercial" performance levels in basic business processes (order fulfillment, repair, procurement, etc.).
- **Agility:** The DoD logistics system must develop new ways of accomplishing its support mission that are tailored to the requirements and constraints of the post-Cold War era, particularly for very rapid expeditionary missions.

How is the logistics transformation progressing?

The DoD has made progress on each of the three dimensions of the logistics transformation, but the progress is uneven. Broadly speaking, reductions in costs have outpaced improvements in responsiveness, which in turn have outpaced improvements in agility.

Cost reduction: Throughout the 1990s, the DoD strongly pressured its logistics community to reduce support costs. In the mid-1990s this pressure was driven in part by the complaint that the DoD logistics system had not shrunk proportionately to the rest of the military during the post-Cold War downsizing. However, that complaint is no longer valid. Over the past ten years, the civilian workforce employed in DoD "central support" has declined over 50 percent, while total expenses for these activities have declined almost 40 percent.⁴ During the same

⁴ "Central support" refers to maintenance and supply activities and other support activities financed through the Defense Working Capital Fund. The cited percentages reflect a comparison of workforce and reported expense data in the Defense Business Operations Fund, FY1991, and the Defense Working Capital Fund, Presidential Budget Submission, FY2001 (Chris Hanks, unpublished RAND research).

period, DoD also dramatically reduced its investment in spare parts inventories by 50 percent, from about \$100B to about \$50B.⁵

Responsiveness. The DoD has had mixed success in improving the speed, reliability, and quality of basic logistics processes. A few processes have improved dramatically on some measures, but generally progress has been slow.

Particularly over the past five years, the DoD has made impressive progress in reducing some process cycle times. To take one especially outstanding example, the DoD's order fulfillment time for spare parts has recently become competitive with best commercial practice.⁶ One result of this improvement is that the DoD is reassessing the mix of organic and commercial providers used for air shipments overseas, to see whether it should reduce its use of the relatively expensive service provided by carriers such as FedEx and Emory.⁷

⁵ Calls for cost reduction are often paired with calls for increased efficiency (for instance, the GAO report cited above calls for more "economy and efficiency"). Gauging the efficiency of the DoD logistics system, as a ratio of inputs to outputs, is difficult for reasons of both definition and data availability. If the DoD logistics system has downsized proportionately to the total DoD, and if logistics support has not deteriorated, then one could infer that the system's efficiency has at least not worsened. Some observers point to increasing problems with the equipment readiness rates of some weapon systems as evidence that logistics support has in fact deteriorated, but others attribute these equipment problems to the increased number of military deployments.

⁶ On the Army's reduction of order fulfillment time through the Velocity Management initiative, see Mark Wang, *Accelerated Logistics: Streamlining the Army's Supply Chain*, RAND, MR-1140-A, 2000. The cited improvements apply to non-backordered items. Today the DoD accepts backorders as a part of standard business practice: in fact, DoD supply depots aim for a supply availability level of only 85 percent.

⁷ The Strategic Distribution Management Initiative, a combined effort of U.S. Transportation Command, the Defense Logistics Agency, and the Air Mobility Command with analytic support from RAND, is undertaking a system-wide reform of the DoD distribution system that capitalizes on the DoD's attainment of very fast and reliable order fulfillment times.

The DoD has made substantial progress improving the responsiveness of other logistics processes, but it has not yet achieved "best practice" performance levels. This situation is typified by the Army's progress in streamlining the process for procuring spare parts. On the one hand, the Army has reduced procurement times by 60 percent, from almost 700 days to under 300 days. On the other hand, 300 days remains very long by commercial standards (by an order of magnitude), so much more improvement is needed.

Agility. After the Cold War, the United States reduced its military force structure and infrastructure while increasing the frequency of deployments to contingencies worldwide. Many of these deployments have occurred in regions with a poorly developed commercial infrastructure. To support such operations effectively, the DoD logistics system must have the flexibility to meet changing and uncertain demands. The system must not only increase throughput on existing supply channels but also quickly construct high-performing channel extensions. Thus far, the DoD has had only limited success in developing and demonstrating such agility.⁸

Does the DoD logistics transformation have the right objectives?

The objectives of the logistics transformation are stated in two documents: the DoD Logistics Strategic Plan (updated annually, most recently for FY2000) and in Defense Reform Initiative Directive (DRID) 54, Logistics Transformation Plans. Both these documents identify six objectives:

⁸ Although military leaders testified before Congress that logistics was not a problem in Kosovo, this success was due to a combination of effective new ways of doing business and many heroic, ad hoc adaptations (Amatzia Feinberg et al., unpublished RAND research on lessons learned from the air campaign in Kosovo).

- Optimize support to the warfighter (meaning, optimize equipment readiness).
- Improve strategic mobility to meet warfighter requirements.
- Implement customer wait time (CWT) as the DoD logistics metric.
- Fully implement joint Total Asset Visibility (TAV) across DoD.
- Reengineer/modernize applicable logistics processes/systems.
- Minimize logistics costs while meeting warfighter requirements.

These six objectives are readily aligned with the three dimensions of logistics transformation. The first, optimizing support to the warfighter, refers to improved responsiveness. Improving strategic mobility refers to improving agility. Implementing a customer-wait-time metric refers to improving responsiveness. Total asset visibility should reduce costs (e.g., by avoiding unnecessary procurement). Reengineering and modernizing processes should both reduce costs and improve responsiveness, and minimizing logistics costs explicitly refers to cost reduction. Taken together, the six objectives comprise a balanced set.⁹

Two other objectives, which are evident in the logistics transformation plans of the Services, might usefully be added.

⁹ They are also balanced in terms of the widely influential book *The Balanced Scorecard* (1996) by Robert Kaplan and David Norton. Kaplan and Norton identify four types of strategic objectives that organizations must balance: improve customer satisfaction; improve business processes; improve financial performance; and improve growth and learning. Of the six objectives listed in the DoD Logistics Strategic Plan, the first is focused on the customer. The second, third, fourth, and fifth have to do with improving business processes. The sixth has to do with improving financial performance. Improvement of growth and learning is sometimes approached through investments in information technology, which are part of the fourth and fifth objectives.

- Reduce demand for logistics support (e.g., through reduced fuel consumption and fewer component failures).
- Reduce logistics footprint for deployed forces.¹⁰

These additional objectives refer primarily to the need to improve the agility of the DoD logistics system, although reduced demand will also improve support costs.

Does the DoD have the right strategy for achieving a logistics transformation?

De facto, DoD's strategy for transforming its logistics system has been to emphasize reducing costs over improved responsiveness, and to emphasize both of these dimensions over improved agility. Arguably, this initial pattern of emphasis reflected the relative difficulty of change on the three dimensions. That is, it would appear easier for the DoD logistics system to reduce its costs (e.g., by programming budget and personnel reductions) than to improve responsiveness (e.g., by reengineering logistics processes).

Given the uneven progress on the three dimensions, it is appropriate to shift emphases now. The DoD could achieve a more balanced transformation by decreasing its emphasis on actions to reduce costs and increasing its emphasis on actions to improve responsiveness and agility.

¹⁰ The phrase "reducing the logistics footprint" is variously interpreted. Desirable transformations of the logistics footprint favorably affect the timing and/or quantity of several resources: (1) military strategic airlift; (2) the services available in the area of operations (AO); (3) the amount of materiel in the AO; and (4) the number of troops in the AO (John Halliday and David Diener, unpublished RAND research on intermediate support structures).

What should be done in the near term?

DoD logistics transformation efforts in the near term should emphasize improving the system's responsiveness and agility.

A supply chain perspective is appropriate because DoD logistics processes are performed through the coordinated actions of provider organizations of many kinds. Some providers are organic to the DoD, others are governmental but not in the DoD (e.g., the General Services Administration), and many, of course, are commercial firms. Efforts to reduce the costs and improve the responsiveness and agility of the DoD logistics system should focus on improving the design of its supply chains from the customer perspective as well as on improving the selection, management, and operations of participating providers.

- **Continue emphasis on improving selection of providers.** The DoD should continue its efforts to improve the sourcing process by which logistics providers are selected, whether they are internal (i.e., organic to the DoD) or external (including commercial firms).^{11,12} Criteria for selecting providers should encompass cost, responsiveness, and agility (i.e., capability to transition to wartime operations). "Lowest

¹¹ Ellen Pint and Laura Baldwin provide guidelines for selecting military activities that are appropriate candidates for competitive sourcing in *Strategic Sourcing: Theory and Evidence from Economics and Business Management*, RAND, MR-865-AF, 1997. Baldwin, Frank Camm, and Nancy Moore show that the sourcing practices of innovative commercial firms hold lessons for U.S. Air Force efforts to improve the procurement of support services in *Strategic Sourcing: Measuring and Managing Performance*, RAND, DB-287-AF, 2000.

¹² For evidence that competitive sourcing and privatization work best when integrated into a larger strategy of process improvement, see "Downsizing Detour: DoD Managers Are Proving That Outsourcing Jobs Isn't Always the Best Way to Save Billions," George Cahlink, *Government Executive*, January 2001. Nancy Moore, Rick Eden, and Mark Wang argue that the Marines should combine competitive sourcing with the improvement of organic logistics processes and logistics performance measurement in *Marine Corps Sourcing Competitions*, RAND, DB-250-USMC, 1999.

bid” should not dominate the selection criteria. Competitive sourcing of activities can help motivate improved performance. Savings can materialize when a function is competitively sourced, regardless of whether an organic or external bidder wins the competition. But a change of provider (e.g., through outsourcing of an organic function) may not be necessary to achieve reduced costs, improved responsiveness, or improved agility.

- **Continue emphasis on improving management of providers.** The DoD should continue efforts to improve its management of contract providers. DoD buys almost all its equipment and supplies across contractual boundaries and almost half of its depot-level logistics support. More effective supply chain integration cannot occur in DoD without explicit consideration of this process. An improved contracting process will enable the DoD to better communicate required performance, better incentivize superior performance, and better monitor actual performance. Improved contracting, together with improved sourcing, may lead to more participation by private firms in the DoD logistics system, but outsourcing per se should not be the goal. The DoD should exploit the full range of permitted governance structures to find the one best suited to a particular provider/customer relationship.¹³ The governance structure selected for a specific logistics provider can affect the potential for future improvements in costs, responsiveness, and agility.
- **Continue emphasis on streamlining and reengineering logistics processes.** The DoD should continue efforts to improve the business

¹³ In *A Casebook of Alternative Governance Structures and Organizational Forms*, RAND MR-1103-OSD, 2000, Michael Hynes, Sheila Kirby, and Jennifer Sloan provide a unique primer on governance structures and organizational forms that present alternatives to the in-house provision of services.

practices and operational performance of providers. The DoD's experience over the past decade shows that dramatic improvement is possible within the constraint of existing resources. Even order fulfillment time, already a success story, can be further improved. For example, the DoD can improve stock positioning so that more items can be moved quickly and inexpensively as part of regularly scheduled deliveries. For relatively inexpensive items, this will require the DoD to redesign local and forward supply points worldwide.¹⁴ More expensive items should be positioned at primary distribution sites so that they can be moved quickly and affordably as part of regularly scheduled deliveries. Similarly, repair times can also be dramatically shortened.¹⁵ Customer wait time, scheduled for implementation this year, should provide a powerful aggregate metric for driving process improvement throughout the DoD logistics system.

- **Emphasize adoption of e-commerce.** Implicit in DRID 54 is a recognition that many commercial firms are capitalizing on the World Wide Web and other Internet technologies in order to integrate their supply chains more deeply.¹⁶ Firms anticipate improvements in cost, responsiveness, and agility throughout their supply chains as a

¹⁴ Ronald Fricker and Marc Robbins developed new algorithms to help the Marine Corps improve the performance of its supply points in *Retooling for the Logistics Revolution: Designing Marine Corps Inventories to Support the Warfighter*, RAND, MR-1096-USMC, 2000. The Army recently reconfigured almost half of its tactical-level supply points for spare parts by applying a RAND-developed algorithm called "dollar cost banding" (Kenneth Girardini, unpublished RAND research on improving the cost-effectiveness of inventories at the Army's supply support activities).

¹⁵ Timothy Ramey shows that by radically reducing the time required to move and repair aircraft components, the Air Force could improve support of the C-5 airlift aircraft while reducing inventory requirements in *Lean Logistics: High-Velocity Logistics Infrastructure and the C-5 Galaxy*, RAND, MR-581-AF, 1999.

¹⁶ DRID 54 requires the services to develop and field a Web-based shared data environment for logistics information by FY 2006 (FY 2004 for early deploying forces).

result of successful implementation of these technologies, both for B2B (business to business) and B2C (business to customer) transactions. The DoD should also press for adoption of the new technologies and business processes known collectively as e-commerce. In particular, it should insure that these quickly emerging and evolving capabilities are incorporated into its next generation of management information systems.

- **Continue to reduce financial and regulatory barriers.** The DoD should continue efforts to reduce the financial and regulatory barriers to improving the performance of logistics processes: "Improvements to the speed and accuracy of basic logistics processes should not be hampered by a financial management system that is slow and inaccurate, that creates errors and delays, and that places obstacles in the path of efficiency and effectiveness."¹⁷ For example, the current price and credit system in the Defense Working Capital Fund can be improved so that customers are clearly motivated to manage their logistics resources in a way that is optimal from the standpoint of the DoD logistics system as a whole.¹⁸ Another example: today's small business rules could be modified so that they do not impede

¹⁷ Marygail Brauner et al., *Dollars and Sense: A Process Improvement Approach to Logistics Financial Management*, RAND, MR-1131-A, 2000.

¹⁸ Marygail Brauner et al. show how the Army could maintain equipment readiness more efficiently, while protecting the solvency of the Army Working Capital Fund, by adopting improved price and credit policies for spare parts in *Evaluating Five Proposed Price and Credit Policies for the Army*, RAND, DB-291-A, 2000. Edward Keating and Susan Gates show that pricing reforms needed by the Defense Finance and Account Service would require changes to current Defense Working Capital Fund regulations in *Defense Working Capital Fund Pricing Policies: Insights from the Defense Finance and Accounting Service*, RAND, MR-1066-DFAS, 1999. Laura Baldwin and Glenn Gotz discuss how prices of repairable spares can be changed to give customers at Air Force installations incentives to make cost-effective repair decisions in *Transfer Pricing for Depot-Level Repairables*, RAND, MR-808-AF, 1998.

efforts to improve the selection and management of external logistics providers and rationalize the supply base.

- **More emphasis on a forward-leaning support infrastructure.** The DoD should continue to explore innovative concepts for improving the agility of its logistics system and to invest in forward-leaning elements of the support infrastructure. A forward-leaning posture is particularly needed to provide logistics support to expeditionary operations, because these require the very rapid deployment and decisive employment of forces. Among the promising concepts being explored are use of joint forward and intermediate support bases, ultra-large airlifters, and very fast surface ships. Among prudent investments already made are acquisition of additional C-17 strategic airlifters, more prepositioned equipment and supplies (both ashore and afloat), improved logistics command and control capabilities, and more productive mobilization and deployment sites.¹⁹ The DoD also needs to continue to strengthen the “virtual” components of its forward-leaning support infrastructure. These include contracts with commercial logistics providers for selected support of deployed units and agreements with U.S. allies and their militaries, e.g., regarding access to ports, permission to use airspace, and loans of equipment types that may be in short supply.²⁰

¹⁹ Lionel Galway et al. show that preparation of forward infrastructure is critical to supporting the Air Force’s new operational concepts, in *Supporting Expeditionary Aerospace Forces: New Agile Combat Support Postures*, RAND, MR-1075-AF, 2000. See also the two companion reports: Robert Tripp et al., *Supporting Expeditionary Aerospace Forces: A Concept for Evolving to the Agile Combat Support/Mobility System of the Future*, RAND, MR-1179-AF, 2000, and Eric Peltz et al., *Supporting Expeditionary Aerospace Forces: An Analysis of F-15 Avionics Options*, RAND, MR-1174-AF, 2000.

²⁰ LTG Vincent Russo (U.S. Army, retired) unpublished RAND research on future DoD mobility and logistics issues.

- **Moderate expectations for reduced demand.** Faced with the challenge of providing improved support at lower costs, some logisticians conclude that the problem with supply is demand: weapon systems consume too much fuel, fire too many rounds, require too much routine maintenance, and break down too often.²¹ Much of the intellectual energy devoted to the logistics transformation has focused on designing support concepts for future weapon systems that are ultra-reliable and ultra-supportable. This is an area where the DoD should moderate its expectations. Even if such systems are acquired and fielded, today's capital equipment such as ships and major aviation and ground systems will remain in the DoD inventory for several decades. Most of the energy of the transformation should focus on improving support to these systems. Certainly these systems can be recapitalized or upgraded to improve their supportability, and this should happen when it appears to be cost-effective. A realistic expectation for the near to middle term is that the demand reduction will offer marginal rather than transformational benefits to the DoD logistics system.
- **De-emphasize the buying out of problems with new technology.** A mindset to buy out problems with new technology creates two sorts of difficulties. First, it is an expensive and slow solution path that can impede progress by providing a reason to delay taking action. Personnel often believe that they should not try to improve the current system because improvement is programmed for a later time; worse, they may even argue that any attempt to improve performance with

²¹ A plain statement of this viewpoint is the following: "The revolution [in military logistics] will occur only after our research community provides us with combat equipment that minimizes the logistical tail needed to sustain it." (LTC Yves J. Fontaine, "Strategic Logistics for Intervention Forces," *Parameters*, Winter 97-98).

today's technology is a waste of resources because all resources should be steered toward the future technology. The other problem is that an organization may not know the real value of technology improvements until it improves today's processes. For instance, today it takes 50-60 days for a unit stationed overseas to receive items transported by ship. To reduce this time, some have advocated acquiring new, faster ships, a major investment. Yet the time that these items spend on the ship crossing the ocean is only about 10-12 days; in fact, it is one of the most reliable segments of the entire process. There is much more leverage to be gained by streamlining the activities before and after the time onboard ship. When the time consumed by these activities has been reduced to just a few days, then the value of an investment in faster ships can be assessed more accurately.

- **Place less emphasis on reducing costs.** It is no longer realistic to consider logistics as a source of large savings or as a major billpayer for other areas, such as procurement. To the extent that further cost reductions are possible, they are best achieved as byproducts of further improving the responsiveness and agility of logistics processes rather than mandated directly through budget cuts. Typically, successful efforts to improve the speed, reliability, and quality of processes also improve their efficiency. As processes become more efficient, resources are freed up, and some of these may be diverted elsewhere. In short, the primary focus of the DoD logistics transformation should be on improving the capabilities provided to the customer of the logistics system —the warfighter, —and reaping whatever cost savings follow. The focus should not be on achieving cost savings by reducing the resources available to the system.

What are the prospects for success?

To the three dimensions of the DoD logistics transformation one might add a fourth. The key word for this fourth dimension is *Culture*.

- **Culture:** The DoD logistics system must become much more adaptable, innovative, and comfortable with continuous change.

The improvements in cost reduction, responsiveness, and agility achieved thus far demonstrate that much of the DoD logistics community has successfully transformed its internal culture. Although some sites, facilities, and personnel remain exceptions, generally the DoD logistics system has become a collection of organizations that know how to change. When assessed against indicators of successful organizational change, today's DoD logistics community scores well. This is especially true of the general officers and civilian leaders. The senior leadership is committed to the DoD logistics transformation; they believe that performance must improve; they have a system-wide perspective; they are concerned with measurement; they are open, even to bad news; they have an experimental mind-set; and they encourage innovation. These qualities bode well for the continued progress of the DoD logistics transformation, particularly if it receives the support of the wider DoD community.

WORKS CITED

- Baldwin, Laura, Frank Camm, and Nancy Moore, *Strategic Sourcing: Measuring and Managing Performance*, Santa Monica, CA: RAND, DB-287-AF, 2000.
- Baldwin, Laura, and Glenn Gotz, *Transfer Pricing for Depot-Level Repairables*, Santa Monica, CA: RAND MR-808-AF, 1998.
- Brauner, Marygail, John R. Bondanella, Ellen M. Pint, Daniel A. Relles and Paul Steinberg, *Dollars and Sense: A Process Improvement Approach to Logistics Financial Management*, Santa Monica, CA: RAND, MR-1131-A, 2000.
- Brauner, Marygail, Ellen M. Pint, Daniel A. Relles, John R. Bondanella, Paul Steinberg, and Rick Eden, *Evaluating Five Proposed Price and Credit Policies for the Army*, RAND, DB-291-A, 2000.
- Cahlink, George, "Downsizing Detour: DoD Managers Are Proving that Outsourcing Jobs isn't Always the Best Way to Save Billions," *Government Executive*, January 2001.
- Fontaine, LTC Yves J., "Strategic Logistics for Intervention Forces," *Parameters*, Winter 97-98.
- Fricker, Ronald D. Jr., and Marc L. Robbins, *Retooling for the Logistics Revolution: Designing Marine Corps Inventories to Support the Warfighter*, Santa Monica, CA: RAND, MR-1096-USMC, 2000.
- Galway, Lionel, Robert S. Tripp, Timothy L. Ramey, and John G. Drew, *Supporting Expeditionary Aerospace Forces: New Agile Combat Support Postures*, Santa Monica, CA: RAND, MR-1075-AF, 2000.
- Hynes, Michael, Sheila Kirby, and Jennifer Sloan, *A Casebook of Alternative Governance Structures and Organizational Forms*, Santa Monica, CA: RAND MR-1103-OSD, 2000.
- Kaplan, Robert and David Norton, *The Balanced Scorecard*, Boston, Mass.: Harvard Business School Press, 1996.
- Keating, Edward, and Susan Gates, *Defense Working Capital Fund Pricing Policies: Insights from the Defense Finance and Accounting Service*, Santa Monica, CA: RAND, MR-1066-DFAS, 1999.

Moore, Nancy, Rick Eden, and Mark Wang, *Marine Corps Sourcing Competitions*, Santa Monica, CA: RAND, DB-250-USMC, 1999.

Peltz, Eric, H.L. Shulman, Robert S. Tripp, Timothy L. Ramey, Randy King, and John G. Drew, *Supporting Expeditionary Aerospace Forces: An Analysis of F-15 Avionics Options*, Santa Monica, CA: RAND MR-1174-AF, 2000.

Pint, Ellen, and Laura Baldwin, *Strategic Sourcing: Theory and Evidence from Economics and Business Management*, Santa Monica, CA: RAND, MR-865-AF, 1997.

Ramey, Timothy, *Lean Logistics: High-Velocity Logistics Infrastructure and the C-5 Galaxy*, Santa Monica, CA: RAND, MR-581-AF, 1999.

Tripp, Robert, Lionel A. Galway, Timothy L. Ramey, Mahyar A. Amouzegar, and Eric L. Peltz, *Supporting Expeditionary Aerospace Forces: A Concept for Evolving to the Agile Combat Support/Mobility System of the Future*, Santa Monica, CA: RAND MR-1179-AF, 2000

Wang, Mark, *Accelerated Logistics: Streamlining the Army's Supply Chain*, Santa Monica CA: RAND, MR-1140-A, 2000.